Honda Reference

Claims 1-4 and 6 were rejected under section 102(b) as being anticipated by Honda, et al., 5851643. The Examiner cited Honda as teaching upper and lower magnetic layers with the lower magnetic layer having anisotropy lower than or equal to the anisotropy of the upper layer. Honda is teaching a magnetic medium for perpendicular recording. Applicant respectfully asserts that the claims as amended distinguish over Honda. Honda's magnetic layers are exchanged coupled and are, therefore, not laminated, decoupled layers as required by the amended claims. Honda state that "forming a magnetic film with multiple magnetic layers separated by a non-magnetic intermediate layer, the magnetic exchange interaction strength can be controlled along the direction of thickness of the magnetic film." See col. 11, lines 1-7.

Coffey Reference

Claims 1-3 were rejected under section 102(b) and (e) as being anticipated by Coffey et al., 2002/0192506. The Examiner Coffey cited as teaching upper and lower magnetic layers with the lower magnetic layer having anisotropy lower than the anisotropy of the upper layer. Coffey is teaching a magnetic medium for use as a thermal spring. Applicant respectfully submits that the claims as amended clearly distinguish over Coffey. Coffey relies on the magnetic exchange interaction (referred to as exchange spring mechanism) between the first stack and the second stack so that the bit pattern can be "copied" or transferred from the second stack to the first stack, as described in paragraph [0058] line 15 through line 18. In the present application "Magnetic Anisotropy Adjusted Laminated Magnetic Thin Films for Magnetic Recording", the upper magnetic layer (original) upper AFC structure) and lower magnetic layer (or lower AFC structure) are decoupled from each other and act independently. In Coffey, the

inventors teach that the first stack, which is further away from the recording head, has higher magneto-crystalline anisotropy than the second stack, which is closer to the recording head. Coffey states:

"The thermal spring magnetic recording media comprises first and second stacks in a laminated structure providing two exchange coupled ferromagnetic layers having different Curie temperatures. The first stack has a high magneto-crystalline anisotropy and a low Curie temperature. The second stack has a relatively low magneto-crystalline anisotropy, a high saturation magnetization and a high Curie temperature." Coffey para. 0015.

In Coffey's Figure 4a element 404 is the "second stack" and is nearest to the surface of the disk. This is in the opposite direction to what is claimed in the present patent application. Each of the independent claims require that the lower magnetic layer (or lower AFC structure), which is further away from the recording head, has lower magnetic anisotropy than the upper magnetic layer (or upper AFC structure), which is closer to the recording head.

Girt Reference

Claims 1-3, 7-9, 13-15 and 25 were rejected under section 102(e) as being anticipated by Girt et al., 6777112. The Examiner Girt cited as teaching upper and lower magnetic layers with the lower magnetic layer having anisotropy lower than the anisotropy of the upper layer. The applicant respectfully submits that Girt clearly specifies that the ferromagnetic layers are ferromagnetically or antiferromagnetically coupled. (See col. 3, lines 38-41). This is different from the laminated media design of the invention in which the magnetic layers in the laminate are decoupled. Because the magnetic layers are decoupled from each other, each magnetic layer acts independently during the writing of transitions by the head field. As a result, in the erase noise versus head write current plot two

peaks are observed, respectively, one for the upper magnetic layer and the other for lower magnetic layer (in this specific example, the lower magnetic layer is the AFC-master magnetic layer) if the magnetic anisotropy is not adjusted, as illustrated in the prior art shown in Fig. 6 in the specification.

It should be noted that Girt describes his discontinuous layers as having grains that are de-coupled, but that is not the same as the decoupled layers claimed by the applicant. (See, for example, col. 5, lines 10-13).

A characteristic of the media according to the invention which distinguishes it over the prior art is further clarified in claim 2 which recites that "the upper ferromagnetic layer switches in response to a first magnetic field generated by a first write current magnitude in the magnetic recording head and the lower ferromagnetic layer switches in response to a second magnetic field generated by a second write current magnitude in the magnetic recording head and the first and second write current magnitudes are approximately equal." This performance is not taught or described in the references and is related to the fact that the invention is a laminated magnetic layer with decoupled upper and lower magnetic layers.

Claim 3 recites a related aspect by specifying that the "normalized DC erase noise plotted versus a write current in the magnetic recording head has a single peak."

In claim 7, the lower magnetic layer is replaced with an AFC structure. The AFC structure serves as one part of the laminated architecture. Therefore, claim 7 likewise distinguishes over Girt.

Dependent claims 8 and 9 for independent claim 7 are comparable to claims 2 and 3. Dependent claims 14 and 15 for independent claim 13 are comparable to claims 2 and 3.

Sato Reference

The Examiner rejected claims 1-3, 7-9, 13-15 and 25 under section 102(e) as being anticipated by Sato. et al. 2003/0232218. Sato patent teaches coupling

between the ferromagnetic layer and
intermediate layer. The inventors also state that the "magnetization direction of the intermediate layer is antiparallel to that of the magnetic layer in a state where no magnetic field is applied thereto". In the present patent application the upper magnetic layer and lower magnetic layer are decoupled from each other and therefore, have the same direction of magnetization at a dc remanent state (a state where no magnetic field is applied after the medium has been saturated.

Section 103 Rejections

The Examiner rejected claim 5 under section 103(a) as being unpatentable over Honda and Takahashi 2003/0099866. The Examiner cited Takahashi for alloy composition related points; therefore, the addition of Takahashi does not cure the lack of teaching of applicant's amended independent claim 1 as discussed above. The other rejections under section 103 also used Takahashi in combination with the other references distinguished above.

Conclusions

Therefore, applicant respectfully submits that as amended claims 1, 7 and 13 are not taught by any of the references taken singly or together. Applicants, therefore, believe that all of the claims in application are now allowable.

Respectfully submitted,

G. Marlin Knight

G. Marlin Knight (Reg. Number 33,409)
(customer no. 000041482)
PO Box 1320
Pioneer, CA 95666
209-295-1982